SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA

Minor-I (Even Semester) – 2018-19

Entry No: 17BEC033

Total number of pages:[01]

Total number of questions: 04

B.Tech. || ECE || Sem IV

Linear Integrated Circuits & Applications (ECL-2030)

Time allowed: 1.5 Hr **Max Marks: 20**

Important Instructions:

- All questions are compulsory
- Sketch the schematics whenever necessary
- Assume any missing data

Q. 1 (a) Derive the expression for CMRR in a dual input balanced output differential amplifier. [3+1+1] CO1

(b) Note down four ideal characteristics of op-amp. CO2

(c) Draw and explain the voltage transfer characteristics of op-amp. CO2

Q. 2. (a) What is the difference between constant current bias and constant current source? [1+3+2] CO1

(b) Derive the expression of emitter resistance in Widlar current mirror. If I_{C1}=1.5 mA and I_{C2}=0.01 mA, then find out the value of emitter resistance. CO1

(c) Define the following terms: (a) Input bias current (b) Supply voltage rejection ratio CO2

Q. 3. (a) Why frequency compensation is necessary in op-amp for stable operation? [1+2+1] CO2

(b) A non-compensated op-amp has a dc gain of 120000 and the break frequencies at 30 KHz and 200 KHz. Write down the open loop gain equation for op-amp as a function of break frequencies. Also find out the operating frequency at which gain will be 30 dB. CO2

(c) For a noninverting feedback op-amp with a single break frequency has unity gain bandwidth product of 10 MHz and closed loop gain of 100. What is the value of closed loop gain at the break frequency? CO2

Q. 4. (a) Why negative feedback is necessary in an op-amp circuit? Derive the modified expression for basic parameters, affected by voltage series feedback op-amp circuit. [3+2] CO1

(b) If R_i=2 MΩ, R_O=60 Ω, R_1=2 K and R_F=30 K for IC 741 op-amp, then calculate the feedback parameters in a non-inverting op-amp. [consider all standard notations] CO1

Sl. No.	Course outcome	Q. No.	Total marks
1.	To understand the design concepts of Operational amplifier IC	1 (a), 2 (a, b), 4	12
2.	To understand the basic characteristics of op-amp	1 (b, c), 2 (c), 3	8